

## Remarks/Arguments

### **Summary**

By this amendment, claims 3 and 11 were cancelled, claims 1-2, 4-10, and 12-13 were amended, and claims 19-21 were added. Accordingly, claims 1-2, 4-10, 12-13, and 19-21 are now pending in this application.

### **Claim Objections**

Claim 1 was objected to as being unclear for reciting the phrase “active layer formed within and without said recess.” Claim 1 has been amended so that it now recites “a portion of the active layer is located within the recess and a portion of the active layer is located outside the recess.”

Claim 2 was objected to for reciting “said semiconductor layers” rather than “the semiconductor layers.” Claim 2 has been amended so that it now recites “the p-type semiconductor layer, the n-type semiconductor layer, and the active layer.”

Claim 7 was objected to for reciting “the gallium” instead of “a gallium.” Claim 7 has been amended so that it now recites “a gallium nitride layer.”

Claim 8 was objected to for reciting “the gallium” instead of “a gallium.” Claim 8 has been amended so that it now recites “a gallium nitride layer.”

### **Claim Rejections - 35 U.S.C. § 102**

In the Office Action dated October 6, 2005, Claims 1-8, 10, and 12-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,285,698 to Romano et al. (hereafter, “Romano”). Applicants respectfully traverse these rejections for at least the following reasons.

Independent claim 1 has been amended so that it now recites a p-type semiconductor layer formed on an active layer “such that a portion of the p-type layer is formed on [a] portion of the active layer located within the recess, wherein *the portion of the p-type layer has a bottom surface having the same planar orientation as the bottom surface of the recess*

*and sidewalls having the same planar orientation as the sidewalls of the recess*” (emphasis added). Figs. 5 and 6 of the instant Application both show, for example, a p-type semiconductor layer 104 formed on active layer 103 such that a portion of layer 104 has a bottom surface with the same planar orientation as a bottom surface of a recess in a n-type semiconductor layer 102, and sidewalls with the same planar orientation as sidewalls of the recess.

In contrast to independent claim 1, Romano fails to disclose that a portion of upper waveguiding layer 320 formed over a recess has the same planar orientation as sidewalls of the recess. Instead, Romano discloses (e.g., in Figs. 3 and 4) an upper waveguiding layer 320 formed on a *continuous flat surface* of active layer 310. Because Romano fails to disclose a portion of waveguiding layer 320 formed over a recess and having the same planar orientation as the sidewalls of a recess, Romano does not support a rejection of independent claim 1 under 35 U.S.C. § 102(b). Accordingly, the rejection of independent claim 1 and the corresponding dependent claims 2, 4-8, 10, and 12-13 is improper and should be withdrawn.

### ***Claim Rejections - 35 U.S.C. § 103***

Claims 9 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Romano. These rejections are respectfully traversed for at least the reasons described above in relation to independent claim 1, and also for the following reasons.

In rejecting claim 9, the Office Action states that it would be obvious to modify Romano so that active layer 310 has M planes and A planes that make angles of 30, 60, 90, 120, 150, 210, 240, 270, 310, or 330 degrees as viewed from an upper surface of waveguiding layer 250 (See, Office Action at paragraph 12). However, Romano never discusses any A or M planes of active layer 310, and moreover, Romano discloses that grooves 255 over which active layer 310 is formed, are *parallel* (See, Romano at Col. 5, line 5). In other words, any planar surfaces that may be defined in active layer 310 by grooves 255 *would not even intersect*, i.e., they would not make *any* angles with each other,

much less the angles defined by claim 9. Accordingly, the rejection of claim 9 is improper and should be withdrawn.

In rejecting claim 12, the Office Action states that Romano discloses a first electrode formed on at least a part of a surface of layer 230 (See, Office Action at paragraph 13). However, layer 230 in Romano is different from the n-type semiconductor layer recited in claim 12 on which a first electrode is formed. For example, the n-type semiconductor layer of claim 12 has a recess formed thereon (See, claim 1) whereas layer 230 does not. Similarly, the Office Action also states that Romano discloses a second electrode 420 formed on at least a part of a surface of layer 340 (See, Office Action at paragraph 13). Layer 340 is different from the p-type semiconductor layer recited in claim 12 on which the second electrode is formed. For example, the p-type semiconductor layer of claim 12 has a portion with sidewalls having the same planar orientation as sidewalls of a recess in the n-type semiconductor layer (See, claim 1) whereas layer 340 does not. Because of the differences between respective layers 230 and 340 and the n-type and p-type semiconductor layers of claim 12, the rejection of claim 12 is improper and should be withdrawn.

### ***New Claims***

New claims 19-21 respectively define (1) recesses arranged in a repetitively corrugated shape with back-to-back side face angles of 120° and 240°; (2) stripe-shaped recesses having a bottom surface aligned with a C-plane of a gallium nitride layer, and sidewalls aligned with an M-plane or an A-plane of the gallium nitride layer; and (3) triangular recesses. Romano fails to disclose any of elements (1), (2), or (3).

**Conclusion**

No further issues remaining, Applicants respectfully request entry of new claims 19-21 and a favorable action on now pending claims 1-2, 4-10, 12-13 and 19-21.

Respectfully submitted,

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